The NORTH Network Delivers Quality Health Care One Broadband Connection at a Time

Innovative telemedicine program helps Ontario extend the boundaries of first-rate health care, reducing cost and improving patient care

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Dr. Ed Brown,
Program Director and Cofounder
NORTH Network

Background

Ontario's northern sector is often referred to as a province within a province. The area is roughly the size of Texas and California combined, yet it is home to fewer than 1.5 million residents. In such a sparsely populated land, health care providers constantly battle shortages of health professionals, distance barriers, isolation, escalating health care costs, and the demands of serving the diverse needs of distinct populations.

In March 1998, public and private sector partners joined together to establish the Northern Ontario Remote Telecommunication Health (NORTH) Network, a pilot telemedicine program designed to deliver specialist consultations, patient education, and continuing medical education via two-way television to some of Ontario's most outlying communities.

Patients benefit from teleconferences with physicians in more than 30 specialties, including cardiology, dermatology, gastroenterology, general surgery, geriatrics, neurology, neurosurgery, orthopedics, pain management, pediatrics, plastic surgery, psychiatry, radiology, rehabilitation, respirology, rheumatology, speech pathology, and surgical preadmission.

"Patients, doctors, and health care professionals have reported great satisfaction with the project in the short period of time since its inception," says Dr. Ed Brown, program director and cofounder.

NORTH Network patient surveys report that 96 percent of patients who have used the network were satisfied or very satisfied with their telemedicine experience, and 94 percent of patients would use it again if needed. In addition, telemedicine has significantly reduced the costs of delivering service and transporting patients.

"When we electronically transport specialists to distant sites, patients can be assessed just as if they had traveled hundreds of miles to the physician's office," Brown says. "Think of the 80-year-old woman who no longer has to travel 100 miles through the snow for a ten-minute follow-up appointment with her doctor, or the mother giving birth who can get a remote ultrasound when there are concerns."

Challenge

Because of telecommunication and budget limitations, the NORTH Network was initially extended to only 16 sites, leaving many of the neediest and most remote communities unconnected and unserved.

"The problem was that our Phase I imple-mentation of the network was built upon dial-up video conferencing and switched 56 lines. As a result, we were restricted to serving hospitals and nursing stations that could afford fixed video conferencing rooms. The network didn't allow us to connect directly to the physician's desktop," Brown says. The network was also slow in transmitting medical images and data, he adds.

"The challenge was to broaden the network to far more sites and have the flexibility to add sites as needed. We were looking for ubiquitous connectivity, not just to one room here or there, but anywhere there is a plug," Brown says.

Solution

In April 2002, the NORTH Network launched Phase II, a switch to a standards-based Internet Protocol (IP) network infrastructure using Cisco multiprotocol label switching (MPLS) technology. The move allowed the NORTH Network to consolidate voice, data, and video and to share content with physicians and health care partners over a secure, flexible, high-speed, scalable, private network carried by Bell Canada's IP backbone.

The new architecture addresses the three major concerns of NORTH Network administrators: availability, security, and quality of service.

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The new infrastructure will also allow health care professionals to better make use of the technology they have in place. The NORTH Network telemedicine workstations provide standards-based, nonproprietary video conferencing and data transmission capabilities. They also support simultaneous transmission of visual and audio signals from various medical peripheral devices, such as electronic stethoscopes and otoscopes. All systems include remote diagnosis and software upgrade capability.

"The Phase II infrastructure provides virtually unlimited scalability, so we can add additional equipment and servers without con-cerns about bandwidth overloading," says Steve Lawrence, account manager for Cisco Systems Canada.

The IP-based network is also designed to accommodate any-to-any traffic patterns, so health care professionals can communicate with each other at will. "This means that doctors can communicate with each other and share images and data. We are opening the door for peer-to-peer collaboration and better flow of infor-mation, which leads to better quality of care," Brown says.

Cisco MPLS technology allows service providers such as Bell Canada to optimize network bandwidth intelligently, and it provides the same level of privacy as switching technologies. In addition, Lawrence says, the NORTH Network was outfitted with additional security features from the Cisco suite of security applications, which are designed to ensure high levels of privacy from firewalls to routers.

Results

With the Phase II conversion to an IP-based network, the NORTH Network was able to extend its telemedicine services to an additional 45 sites. "From a medical perspective, we're deliver-ing to our remote colleagues continuing medical education, and to patients the kind of care that was once available only in cities with major health care facilities," Brown says.

The government of Canada is also reaping benefits. Studies show that decreased access to medical care results in increased hospitalization rates. Such is the case for Northern Ontario, where hospitalization rates are 25 percent higher than the provincial average. "By bringing heath care to outlying communities, we can reduce hospital visitations," Brown says.

Next Steps

"In two to three years, we hope to extend care beyond the hospital and nursing station to virtually anywhere that broadband services exist," Brown says. "I hope that telemedicine will be recognized as the killer application that raises physician interest in information technology."

What Cisco Offers

Cisco multiprotocol label switching (MPLS) combines the intelligence of routing with the performance of switching. MPLS is key to scalable virtual private networks and end-to-end quality of service.